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6. A model of this surface was exhibited by Professor Emmons as a guide to the study of its properties. The ranges of x and y considered were $x \geqq 0$ and $y \geqq 0$; z may vary from negative infinity to positive infinity. Various plane sections were studied and the points of discontinuity and singularity were investigated. A system of ruled surfaces, having the given surface as an envelope, was set up.

7. Given OA_1, OA_2 fixed radii of two circles c_1, c_2, and O_1, O_2 as variable centers of two mutually tangent circles c_3, c_4 tangent to c_1, c_2 respectively at A_1, A_2; then O_1, O_2 will be the corresponding elements of a projective correspondence between the points of the lines OA_1 and OA_2. The lines O_1O_2 will be tangents to a circle c_5 tangent to OA_1 and OA_2. The locus of the point of contact of circles c_3, c_4 is a circle, c_6, concentric with c_5 and passing through A_1 and A_2. Professor Wester extended this result to non-concentric circles c_1, c_2, and special cases were discussed.

B. F. SIMONSON, *Secretary-Treasurer.*

THE MAY MEETING OF THE KENTUCKY SECTION.

The fifth annual meeting of the Kentucky Section of the Mathematical Association of America was held at the University of Kentucky, Lexington, Ky., on May 7, 1921. The meeting consisted of one session with Professor H. H. DOWNING presiding.

The attendance was eighteen, including the following six members of the Association: P. P. Boyd, J. M. Davis, H. H. Downing, Elizabeth LeStourgeon, E. L. Rees, C. H. Richardson.

The members and guests were entertained at luncheon by Professor H. H. Downing, the retiring chairman of the Section. Professor C. H. RICHARDSON was elected chairman of the Section and Professor ELIZABETH LESTOURGEON, secretary. Upon the invitation of Professor Richardson, it was voted to hold the next meeting at Georgetown College.

The following papers were presented:

(1) "Objective measurements of results of teaching mathematics" by Professor J. W. BRANSON, Centre College (by invitation);

(2) "Geometric proof of a theorem concerning the roots of a quartic" by Professor E. L. REES, University of Kentucky;

(3) "The influence of modern trends in education upon mathematics as a school subject" by Mr. H. M. YARBROUGH, Western Kentucky State Normal School (by invitation);

(4) "The need and content of a course in commercial mathematics" by Professor C. H. RICHARDSON, Georgetown College;

(5) "History of arithmetic and algebra" (illustrated) by Dean P. P. BOYD, University of Kentucky.

Abstracts of the papers and discussions follow below, the numbers corresponding to the numbers in the list of titles:

1. Professor Branson's discussion was based on the assumption that practically every teacher depends upon rather vague impressions for his estimates of the progress of his students, whereas he should have some well-defined standards for measuring results objectively. A method which was recommended was the analysis of each assignment into the distinct processes involved, and a record of the success of each student in dealing with these processes. The idea was not so much to determine the grade to which the student is entitled, as to determine what processes the student has mastered as a result of previous methods of instruction with a view to improving those methods which produce poor results.

2. Professor Rees gave a geometric proof of the theorem stating the conditions which govern the nature of the roots of the quartic equation $x^4+qx^2+rx+s=0$. Having shown that the roots of the equation are the abscissas of the points of intersection of the line $y=-rx$ and the symmetric quartic $y=x^4+qx^2+s$ and that the discriminant equals a constant times the product of the vertical distances from the line $y=-rx$ to the points of tangency of the parallel tangents, the various cases of the theorem were then proved from diagrams exhibiting the different forms and positions of the quartic curve.

3. In the opinion of Mr. Yarbrough, the modern tendency to over-emphasize the so-called practical and the vocational in education leads to an indifferent attitude on the part of the student toward any mathematics that does not seem to him to be capable of functioning directly in his everyday life. The student is not encouraged to strive for intellectual training and achievement, but rather to strive for industrial efficiency alone, and this is held up to him as an ideal of education. Since only the more elementary branches of mathematics are essential to the average individual, the average student sees no value in the subject and hence his work is mediocre in character. The current system of measuring the student's progress by credit leads the student to regard "units" and "hours" rather than mental achievement as a measure of his education. As a result he elects those subjects in which he can obtain the maximum amount of credit by a minimum expenditure of effort. In order to secure interested and efficient work, teachers of mathematics must find some way to lead the student to appreciate the cultural as well as the practical value of mathematics.

4. Professor Richardson showed that there is a growing recognition on the part of leading financiers and bankers of the need for an understanding of the mathematical theory underlying their work; that in the actuarial field this is particularly true. He indicated how the mathematics departments of colleges might take advantage of this opportunity, and outlined a course in commercial mathematics which would be of advantage not only for the classes specified but to those entering upon other than commercial pursuits.

5. Dean Boyd gave an outline statement of the achievements of the Egyptians, the Babylonians, the Greeks, the Hindus, the Arabs and the Christian Europeans up to the time of Descartes. Illustrations of ancient methods and problems and some idea of the progress of mathematical thought were given. Among many slides shown were a number picturing pages from famous manuscripts.

ELIZABETH LESTOURGEON, *Secretary.*